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GENERAL NOTES

The Beginning of the Astronomical Day

As our readers know, the astronomical day begins at noon, twelve hours after the beginning of the civil day.

For several decades a proposal to have the astronomical day begin at midnight has received serious consideration.

Following the lead of the Royal Astronomical Society of London, the American Astronomical Society in 1917 appointed a committee to consider and report upon the proposal. This committee consists of Professor W. S. Eichelberger, Professor of Mathematics in charge of the American Ephemeris and Nautical Almanac, Chairman, and of Directors Frost and Campbell, of the Yerkes and Lick Observatories.

The committee reported in August, 1918, to the American Astronomical Society in favor of the proposal, provided a decision to this end could be reached by the several governments interested. The Astronomical Society formally approved of the report and it was forwarded to the officers of the Royal Astronomical Society as an expression of American astronomical opinion—the prevailing but not unanimous opinion.

The recommendation that the astronomical day coincide with the civil day was accompanied by an expression of opinion that all changes in time systems whose desirability within the next half century can now be foreseen ought to occur at one and the same time. In order to adopt a round-number date for the change which could always be remembered without effort, to give time for further consideration, and to accommodate the preparation of the various nautical almanacs, it was recommended that the change take effect on January 1, 1925.

There appear to be no seriously inconvenient consequences of the proposed change, even in the debated matter of the Julian day reckoning. It will merely be necessary to remember that 0.5 day should be added to every Julian date prior to 1925 when comparing observing times before 1925 with observing times following January 1, 1925.

The opinion of practical navigators as to the desirability of the change appears to be almost unanimous in its favor.

It does not seem that further action can be profitably taken until the policies of the astronomers and navigators of other nations shall have been expressed. W. W. C.

DEARTH OF COMET DISCOVERIES

The transfer of resources to the problem of winning the war is probably responsible for the small number of current comet discoveries.

Mr. William Reid, in South Africa, reported the discovery of an unexpected comet by him on June 12, 1918, in right ascension $9^h 16^m 36^s$, and declination $-8° 10'$, with daily motion 48′ due south. Its position with reference to the Sun was such that the object could not be observed from the northern hemisphere. No additional observations appear to have been published, and accordingly the discovery seems to have failed of verification.

No other discovery of an unexpected comet has been reported since April 18, 1917.[1]

Jonckheere at Greenwich observed the return of Wolf's periodic comet on July 9, 1918. This is the fifth return of the comet since its original discovery in 1884. Barnard at the Yerkes Observatory independently observed the return of this comet on July 12th.

Fayet at Nice, France, re-observed Borrelli's periodic comet on August 7, 1918. This is the third observed appearance of the object.

These periodic comets are faint. W. W. C.

DIFFERENCE OF LONGITUDE BETWEEN WASHINGTON AND PARIS

On the completion of the powerful naval radio station at Radio, Virginia, an opportunity was offered for the first time of making a direct determination of the difference in longitude between the Paris and Washington Observatories, by means of an exchange of wireless signals from this station and from the Eiffel Tower in Paris. Proposals that such a determination be made were submitted to the French authorities by representatives of the United States at the Conference International de l'Heure held at Paris in October, 1912, and following their favorable reception, a program of time observations and exchange of radio signals was carried out in the fall and winter months of 1913-1914. The observational and signal work was performed at each station, in parallel, by two sets of observers, one French and the other American. The astronomical observers were from the Paris and U. S.

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[1] After this note was written a faint unexpected comet was discovered by Dr. R. Shorr, at Hamburg (November 23).

Naval Observatories, and the radio observers from the French Army and Navy and the U. S. Navy. At the end of the first period of work, both sets of observers interchanged stations and repeated the program.

The Appendix of Volumn IX, *Publications of the U. S. Naval Observatory*, recently issued, gives the results obtained by the American observers. An examination of this work impresses one with the care and skill with which the program was carried thru. The astronomical side, or the determination of the clock corrections at each station, was of course conducted with the best modern types of instruments and clocks and in accordance with present accepted methods of observations. Likewise, the exchange of radio signals would appear to represent the best of which this method was then capable for long distance signals.

Certain limitations peculiar to the use of Hertzian waves for longitude determinations between stations separated by great distances, are perhaps not familiar to the general reader. The requirement that uninterrupted use of the ether (which transmits these waves) be secured during the exchange of signals, is not easily fulfilled for more than a very limited time. Furthermore, the most successful transmission of such waves over so great a distance as the one here attempted can be accomplished only during the winter months, as warm weather is particularly unfavorable for this work.

The transmitter, sending the signals was operated directly by the standard clock, while at the distant receiving station it was necessary for the observer to compare by ear these signals (one second interval) with those of a mean time chronometer beating half seconds, noting the times of coincidence between the two. As a long signal is considered better than a short one by radio observers, when working with faint signals, the ones in the present case were made about half a second long. It was then necessary for the observer to concentrate his attention, for the coincidence, on the beginning of the signal. The present method of receiving wireless signals evidently offers a good opportunity for the introduction of personal equation. It would seem that the effect of this has been largely eliminated thru the interchange of stations by the observers.

From the work of the thirty-nine nights on which radio signals were sent in both directions, the double time of transmission was found to be 0.0429 ±0.0029 second. Assuming the distance from Washington to Paris as 3,840 statute miles, this gives a speed of propagation of the waves of 179,000 ±12,000 miles per second. For the double time of transmission the French observers obtained 0.04244 second, corresponding to a speed of propagation of 181,000 miles per second. The observed velocity of Hertzian waves from the above determinations agrees with that of light to within the unavoidable errors of observation.

The following values were obtained for the difference in longitude between the standard meridians of the (new) Washington and Paris Observatories, after correction for the above time of transmission.

For the first period of 38 nights.......	$5^h\ 17^m\ 36^s.549 \pm 0^s.0051$
For the second period of 29 nights....	$36\ .758 \pm 0\ .0027$

The adopted result of the determination, the simple mean of the two periods, is

Washington-Paris.................**$5^h\ 17^m\ 36^s.653 \pm 0^s.0031$**

In order to account for the systematic difference between the results of the two periods, several causes are considered and the approximate corrections for their effects are given. Among these, it is of interest to note that the variation of longitude amounted to 0.01 second in the interval between the two periods. The introduction of these corrections would reduce the observed longitude by $0^s.014$, but the authors evidently prefer to accept the mean of the uncorrected values for the two periods.

Using the present accepted value of the Greenwich-Paris longitude, *i. e.*, $0^h\ 9^m\ 20^s.932 \pm 0^s.014$, the above determination gives for

Washington-Greenwich.............**$5^h\ 8^m\ 15^s.721 \pm 0.014$**

The value of the longitude of Washington from Greenwich, given in the American Ephemeris ($5^h\ 8^m\ 15^s.78$) is that obtained by Schott, based largely upon the result of the 1892 cable determination of the difference of longitude between Montreal, Canada and Greenwich, for which only the preliminary value was available. A correction of $-0^s.05$ should be applied to this preliminary result as shown when the definitive one was published, so that Schott's value of the Washington-Greenwich longitude is somewhat too large.

The reduction and discussion of the observations of the present campaign were under the direction of Professor Littell, with whom was associated Assistant Astronomer Hill. J. H. M.

THE SMITHSONIAN SOLAR CONSTANT OBSERVATORY AT CALAMA, CHILE

The following account of the new Smithsonian observing station at Calama, Chile, was given by Professor C. G. Abbott, at the twenty-second meeting of the American Astronomical Society and is taken from the November (1918) number of *Popular Astronomy:*

Simultaneous solar constant measurements in California and Algeria, pyrheliometric observations in California and Arequipa, Peru, daily comparisons of the solar constant with the distribution of radiation over the solar disk, comparisons with terrestrial magnetic variations and with terrestrial air temperatures, all having indicated and confirmed the existence of solar variability of 5 per cent or more in range and irregular periodicity over intervals of a few days or weeks, the Smithsonian Institution has established an observing station at Calama, Chile, (Lat. 22° 28′ S, Long. 68° 56′ W, Alt. 2250 m.) for observing the solar variability for a term of years.

The site, according to several years of meteorological observations, is the most cloudless in the world. For the two years, 1913-14, the average number of wholly cloudless days was at 7 A. M. 228; 2 P. M. 206; 9 P. M. 299; and of wholly cloudy days, none. The precipitation is zero; wind seldom exceeds 3 on a scale of 12; temperature seldom falls below 0° or above 25° C. The expedition consists of A. F. Moore, Director, L. H. Abbot, Assistant, and includes bolometric, radiometric and meteorological apparatus, supplies, tools and every needful equipment for the most accurate observations of the solar constant of radiation. A site furnished by the Chile Exploration Company at Calama was occupied June 25, 1918, and work is now begun.

THE FLUCTUATING BRIGHTNESS OF NOVA AQUILAE

The new star in *Aquila*, on June 9-10, nearly as bright as *Sirius* and now sometimes fainter than the 5th magnitude, is observed systematically by several enthusiastic astronomers in New Zealand. These observations are especially valuable in that they are made in that part of the day when the star is below the horizon for American and European observers. Dr. C. E. Adams, Director of the Hector Observatory, Wellington, N. Z., has recently sent us copies of observations made by Rev. O. Blundell of New Plymouth, Mr. A. G. Crust of Dunedin, Mr. G. F. Dodwell of Adelaide, South Australia, Dr. C. E. Adams of Wellington, and Mr. A. C. Gifford. These we have forwarded to Harvard College Observatory. W. W. C.